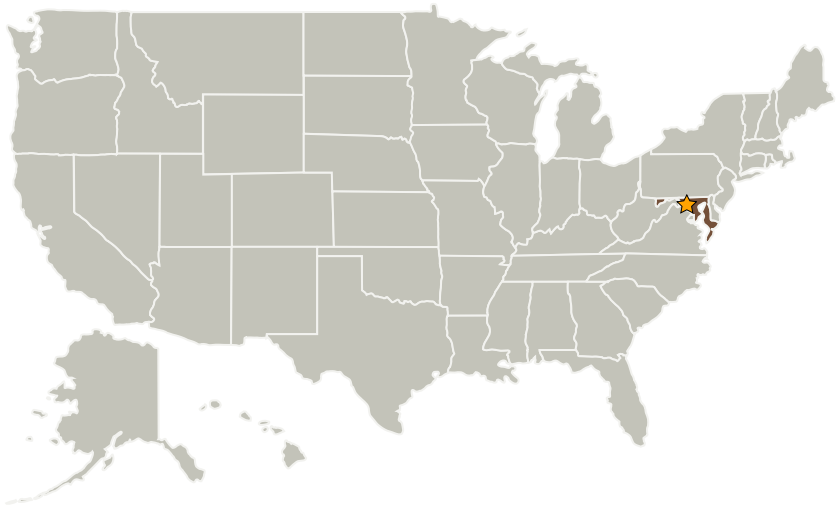
Miniature Loop Heat Pipe with Multiple Evaporators and Multiple Condensers, Phase II

Completed Technology Project (2007 - 2009)

Project Introduction

Loop Heat Pipe (LHP) is a high performance heat transport device using capillary forces to circulate the working fluid in a closed loop. Conventional LHPs usually have one capillary pump (evaporator) to acquire waste heat from a heat source. Recent efforts have focused the development of LHPs that contain two or more evaporators. Even though two-evaporator LHPs performed very well, the volume of each compensation chamber (CC) became much larger than that of the single-evaporator counterpart. The reason was that all but one CC would be liquid-filled during normal operation. The one that was not liquid-filled had to be large enough to accommodate the system liquid expansion at maximum temperature. As a result, LHPs with more than 3 evaporators were not feasible for practical applications simply because the CCs became prohibitively large. In the current research, the CCs of a multiple-evaporator LHP were capillarily-linked. In other words, the CCs always contained a mixture of liquid and vapor (two-phase), allowing the loop to operate with a much smaller fluid charge. Consequently the required CC volume was also reduced.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
TTH Research, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Laurel, Maryland

Primary U.S. Work Locations
Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.2 Heat Transport